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Methicillin-susceptible *Staphylococcus aureus* (MSSA) strains in Universiti Kebangsaan Malaysia Medical Centre (UKMMC), Malaysia: association between *agr* groups and virulence genes

H.F. Sapri*, N.A. Mohamad Sani, H.M. Neoh, S. Hussin

Universiti Kebangsaan Malaysia Medical Center, Kuala Lumpur, Malaysia

Background: *Staphylococcus aureus* is an important pathogen in human disease where genetic regulatory elements and toxin-expressing genes are associated with its pathogenic potential. Special attention is being paid to methicillin-resistant *S. aureus* (MRSA); with fewer studies carried out on methicillin-susceptible *S. aureus* (MSSA) even though they are often more genetically variable and usually cause a higher incidence of infection in hospitals than their methicillin resistant counterpart. We collected MSSA strains isolated in our university hospital (UKMMC) in 2009 and investigated the molecular characteristics of these strains.

Methods: A cross-sectional study on MSSA strains was performed in UKMMC in 2009. 880 cases of MSSA were selected for *agr* (accessory gene regulator) group typing. The presence of 4 virulence genes (collagen binding adhesion, *cna*; staphylococcal enterotoxin H, *seh*; Panton-Valentine leukocidin, PVL; toxic shock syndrom toxin-I, TSST-I) in these strains were also detected.Both molecular typing was carried out using a multiplex PCR protocol. The association, if any, between *agr* group and presence of the 4 tested toxin genes was also determined in our tested strains.

Results: In our study, 58.9% (518) of MSSA strains harboured at least one of the 4 tested virulence genes: 51.6% (454) had *cna*, 21.8% (192) possessed *seh*, 10.2% (90) had PVL and 6.8% (60) haboured TSST-1. For *agr* group typing, 39.8% (350), 12.7% (112), 28.0% (246) and 4.3% (39) of our strains were detected as *agr* I, II, III or IV, respectively. Nevertheless, 15.2% (133) of the strains were untypeable for *agr*. Interestingly, we noticed that most of the *agr* group III strains were also positive for both *cna* and *seh* ($P < 0.05$).

Conclusion: In 2009, *cna* was commonly detected in our collection of UKMMC MSSA strains, whereas TSST-l was rarely detected. Most of the strains were detected as *agr* group I. We noticed a strong association between the presence of both *cna* and *seh* virulence genes and *agr* group III in our strains. The importance of this observation remains to be investigated.

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Therapeutic strategy for deep muscle abscess: from the review of 22 cases of institutional experience

T. Sato*, R. Nomura, H. Yuzawa, T. Koakutsu, H. Kuroda, S. Yamanouchi, S. Kushimoto

Tohoku University hospital, Miyagi pref., Japan

Background: Objective: Deep muscle abscess has been reported as rare but the frequency is increasing with the liberal use of CT. Although the management consists of drainage, mainly percutaneous, and prompt initiation of antibiotic therapy, therapeutic strategy has not been established. The purpose of present study is to establish appropriate strategy by reviewing our experience.

Methods: Twenty-two cases of deep muscle abscess treated in our facility from 2007 to 2011 were reviewed retrospectively.

Results: The mean patient age was 62.5 years. Abscess mainly occurred as a result of bony infection (10 cases). 7 had diabetes mellitus and 8 had septic shock with DIC. The most frequent pyoculture isolate was MSSA (15 cases). Deep muscle, mainly psoas abscess was managed by a combination of antibiotic therapy and percutaneous or surgical drainage, according to maximum diameter of abscess in horizontal view of CT; 1) antibiotic therapy alone was attempted to abscess within 3 cm or hardly to puncture, 2) percutaneous drainage was attempted to over 3 cm or easy to puncture within 3 cm in diameter, 3) surgical drainage was performed to abscess over 3 cm with multilocular or percutaneous drainage failed. In patients treated with antibiotic therapy alone (10 cases), mean hospital stay was 70.3 days. In those undergoing percutaneous drainage (3 cases), mean drainage period was 18.8 days and hospital stay was 113.3 days, while 10.6 days and 51.9 days, respectively, in patients undergoing surgical drainage (9 cases). 3 cases required converting to surgical drainage following inadequate percutaneous drainage. All patients survived without recurrence of abscess.

Conclusion: Percutaneous drainage for deep muscle abscess tended to need long period and may fail to complete resolution, because abscess had high viscosity content in most cases and can be complicated with multilocular form. While surgical drainage was not prevailed well, the procedure can be performed safely and sufficient resolution of abscess may be obtained in a short period, even in large or multilocular.

Deep muscle abscess was serious illness and easily spoil ADL, therapy should be finished quickly, and early surgical drainage considered in patients with large or multilocular abscess.

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